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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LY, ANH	
ART UNIT	**PAPER NUMBER**
2172	14

DATE MAILED: 04/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

P24

Office Action Summary	Application No.	Applicant(s)
	09/766,247	SHAW, SANDY C.
	Examiner	**Art Unit**
	Anh Ly	2172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *31-96* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *31-96* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Request Continued Examination

1. The request filed on 04/09/2004 for a Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application No. 09/766,247 is acceptable and a RCE has been established. An action on the RCE follows.

2. Claims 31-96 are pending in this application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 31-32, 33-34, 35-38, 39-48, 49, 50-52, 59-63, 64, 65, 66, 67, 68-69, 70-73, 74-83, 84, 85-87 and 93-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,416,848 issued to Young in view of US Patent No. 6,141,657 issued to Rothberg et al. (hereinafter Rothberg).

With respect to claim 31, Young teaches mathematically generating from a point in the multidimensional map (using mathematical analysis and manipulation of ordered information in multidimensional space to points on the complex plane in the Julia sets and the controlling the geometry of model with the mathematically iteration function or algorithm: col. 8, lines 55-67, col. 9, lines 8-18, also see col. 4, lines 4-60 and col. 1, lines 8-12, also see abstract and col. 5, lines 15-32).

comparing a number of the target strings with the comparison string to determine for each target string if a mark should be placed on the point in the map corresponding to the comparison string (matching the points in the multidimensional space with the systematic method having the capabilities for controlling the geometry of models: col. 4, lines 61-67 and col. 5, lines 1-32); and

repeating the steps of generating and comparing for a plurality of comparison strings (mathematically iterated function on the points in the multidimensional space: col. 5, lines 15-32).

Young teaches mathematically iterative function to evaluate the points in the multidimensional space to determine the points in the Julia sets. The points are the set of periodic repelling points and are called Julia sets and the maps can also be made of the parameter plane where each point represents the value of the parameter (the orbit

of the critical point of Julia set in the dynamic plane maps (col. 4, lines 4-60). Young does not explicitly teach the dataset.

However, Rothberg teaches a dataset: sample sequence the target sequence such as DNA sequence comprising a plurality of nucleic acids of database sequence is generated by recognition means: col. 16, lines 52-67 and col. 17, lines 1-20; also see col. 63, lines 24-32).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Young with the teachings of Rothberg so as to have DNA sequence datasets for analysis in the n-dimensional space in order to find the closet sequence (see abstract). The motivation is that the mathematically analysis and manipulation of sequence information (or dataset pattern such as DNA sequence) in a multidimensional space with a complex plane by using the fractal geometry in order to generate a new pattern that optimizes the information measure (Rothberg - col. 16, lines 4-14).

With respect to claim 32, Young teaches discloses wherein the step of generating the comparison string comprises using an iterative algorithm, such that the comparison string is calculated from a point in any set of points that can serve as the domain of an iterative function (col. 4, 4-60).

With respect to claims 33-34, Young teaches a dynamic map including points on the complex plane and points in the Julia sets and Mandelbrot fractal set (col. 4, lines 24-60 and col. 7, lines 18-22).

With respect to claim 35-38, Young teaches wherein the step of mathematically generating the comparison string further comprises transforming the numbers of the comparison string to have values within a set of interest (Julia sets: col. 4, lines 25-42);

wherein the step of mathematically generating the comparison string further comprises laying a grid over the points in the map (multidimensional space with a complex plane having points for the iterative mapping: col. 8, lines 55-67 and col. 9, lines 8-18 and col. 4, lines 25-42);

wherein the step of mathematically generating the comparison string further comprises restarting the step of generating the comparison string if the iteration has become unbounded (col. 5, lines 1-32); and

wherein the step of mathematically generating the comparison string further comprises generating a comparison string of any length (calculation the length: col. 1, lines 35-48).

With respect to claim 39-48, Young discloses a method as discussed in claim 31.

Young teaches mathematically iterative function to evaluate the points in the multidimensional space to determine the points in the Julia sets. The points are the set of periodic repelling points and are called Julia sets and the maps can also be made of the parameter plane where each point represents the value of the parameter (the orbit of the critical point of Julia set in the dynamic plane maps (col. 4, lines 4-60). Young does not explicitly teach the dataset, the target string, the scoring of the string.

However, Rothberg teaches wherein the step of comparing comprises scoring of the comparison string by evaluating a function having the comparison string and one of

the number of the target strings as inputs, such that the evaluation may be repeated for other of the number of the target strings (col. 20, lines 54-67 and col. 21, lines 1-19); wherein scoring of the comparison string comprises placing a mark on the point in the map if the score or some other property corresponding to the point meets some relevant criteria (col. 70, lines 15-40); wherein the criteria comprises the comparison string having the highest score, where the score is based on some similarity measure to the target string (col. 18, lines 8-38 and col. 70, lines 15-40); wherein scoring of the comparison string further comprises preliminary testing of properties of the comparison string alone as criteria to initiate scoring (col. 16, lines 48-67 and col. 70, lines 15-40); wherein scoring of the comparison string further comprises a test of the comparison string using the target string (col. 60, lines 26-48; also see col. 1, lines 16-21); wherein not all of the numbers in the comparison string or the target string must be used in the test (col. 37, lines 1-42); wherein scoring of the comparison string further comprises a one-to-one comparison between corresponding numbers in the target string and the comparison string (col. 70, lines 15-40 and col. 30, lines 54-65); wherein the one-to-one comparison may be between corresponding sequential or non-sequential numbers in the target string and the comparison string (col. 37, lines 44-58); wherein scoring of the comparison string further comprises studying the behavior of the scoring function, such as determining the function's minima and maxima (col. 30, lines 54-65, col. 37, lines 44-58 and col. 70, lines 15-40); and wherein only the comparison string is used as relevant input to the scoring function (col. 16, lines 48-67 and col. 70, lines 15-40).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Young with the teachings of Rothberg so as to have DNA sequence datasets for analysis in the n-dimensional space in order to find the closet sequence (see abstract). The motivation is that the mathematically analysis and manipulation of sequence information (or dataset pattern such as DNA sequence) in a multidimensional space with a complex plane by using the fractal geometry in order to generate a new pattern that optimizes the information measure (Rothberg - col. 16, lines 4-14).

With respect to claim 49, Young teaches wherein placing a mark on the point in the multidimensional map comprises storing the coordinates of the point corresponding to the target string or properties of the comparison string in memory, a database or a table (multidimensional space: col. 8, lines 55-67 and col. 9, lines 8-18).

With respect to claims 50-52, Young teaches a video camera as input receiver, colored graphical display and resolution (col. 6, lines 28-60 and col. 7, lines 41-60).

With respect to claim 59-63, Young discloses a method as discussed in claim 31.

Young teaches mathematically iterative function to evaluate the points in the multidimensional space to determine the points in the Julia sets. The points are the set of periodic repelling points and are called Julia sets and the maps can also be made of the parameter plane where each point represents the value of the parameter (the orbit of the critical point of Julia set in the dynamic plane maps (col. 4, lines 4-60). Young does not explicitly teach the dataset, the target string, the scoring of the string.

However, Rothberg teaches wherein the uses for the method comprise analyzing large datasets, such as for DNA sequence data, protein sequence data, gene expression datasets, demographic data, statistical data, and clinical (patient) data (col. 5, lines 52-67 and col. 6, lines 1-43); wherein the uses of the method comprise analyzing datasets consisting of heterogeneous data, such as both gene expression data and clinical (patient) data (col. 5, lines 52-67 and col. 6, lines 1-43); wherein the uses for the method comprise data compression (col. 43, lines 50-60); wherein the steps may be automated (col. 34, lines 4-10; also see figs. 16A-D); and wherein separate processes involved in the steps of generating and comparing may be processed simultaneously by a plurality of processors (col. 77, lines 27-32).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Young with the teachings of Rothberg so as to have DNA sequence datasets for analysis in the n-dimensional space in order to find the closet sequence (see abstract). The motivation is that the mathematically analysis and manipulation of sequence information (or dataset pattern such as DNA sequence) in a multidimensional space with a complex plane by using the fractal geometry in order to generate a new pattern that optimizes the information measure (Rothberg - col. 16, lines 4-14).

With respect to claim 64, Young teaches mathematically generating from a point in the multidimensional map a comparison string comprising a dataset using an iterative algorithm, such that the comparison string is calculated from a point in any set of points that can serve as the domain of an iterative function (using mathematical analysis and

manipulation of ordered information in multidimensional space to points on the complex plane in the Julia sets and the controlling the geometry of model with the mathematically iteration function or algorithm: col. 8, lines 55-67, col. 9, lines 8-18, also see col. 4, lines 4-60 and col. 1, lines 8-12, also see abstract and col. 5, lines 15-32);

comparing a number of the target strings with the comparison string to determine for each target string if a mark should be placed on the point in the map corresponding to the comparison string (matching the points in the multidimensional space with the systematic method having the capabilities for controlling the geometry of models: col. 4, lines 61-67 and col. 5, lines 1-32); and

repeating the steps of generating and comparing for a plurality of comparison strings (mathematically iterated function on the points in the multidimensional space: col. 5, lines 15-32).

Young teaches mathematically iterative function to evaluate the points in the multidimensional space to determine the points in the Julia sets. The points are the set of periodic repelling points and are called Julia sets and the maps can also be made of the parameter plane where each point represents the value of the parameter (the orbit of the critical point of Julia set in the dynamic plane maps (col. 4, lines 4-60). Young does not explicitly teach the dataset.

However, Rothberg teaches a dataset: sample sequence the target sequence such as DNA sequence comprising a plurality of nucleic acids of database sequence is generated by recognition means: col. 16, lines 52-67 and col. 17, lines 1-20; also see col. 63, lines 24-32).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Young with the teachings of Rothberg so as to have DNA sequence datasets for analysis in the n-dimensional space in order to find the closet sequence (see abstract). The motivation is that the mathematically analysis and manipulation of sequence information (or dataset pattern such as DNA sequence) in a multidimensional space with a complex plane by using the fractal geometry in order to generate a new pattern that optimizes the information measure (Rothberg - col. 16, lines 4-14).

With respect to claim 65, Young teaches mathematically generating from a point in the multidimensional map (using mathematical analysis and manipulation of ordered information in multidimensional space to points on the complex plane in the Julia sets and the controlling the geometry of model with the mathematically iteration function or algorithm: col. 8, lines 55-67, col. 9, lines 8-18, also see col. 4, lines 4-60 and col. 1, lines 8-12, also see abstract and col. 5, lines 15-32);

evaluating a function having the comparison string and one of the target strings as inputs, such that the evaluation may be repeated for a number of the other target strings, to determine for each target string if a mark should be placed on the point in the multidimensional map corresponding to the comparison string (matching the points in the multidimensional space with the systematic method having the capabilities for controlling the geometry of models: col. 4, lines 61-67 and col. 5, lines 1-32); and

repeating the steps of mathematically generating for a plurality of comparison (mathematically iterated function on the points in the multidimensional space: col. 5, lines 15-32).

Young teaches mathematically iterative function to evaluate the points in the multidimensional space to determine the points in the Julia sets. The points are the set of periodic repelling points and are called Julia sets and the maps can also be made of the parameter plane where each point represents the value of the parameter (the orbit of the critical point of Julia set in the dynamic plane maps (col. 4, lines 4-60). Young does not explicitly teach the dataset and scoring the comparison string.

However, Rothberg teaches a dataset: sample sequence the target sequence such as DNA sequence comprising a plurality of nucleic acids of database sequence is generated by recognition means: col. 16, lines 52-67 and col. 17, lines 1-20; also see col. 63, lines 24-32) and scoring the fragment dataset (col. 70, lines 28-40).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Young with the teachings of Rothberg so as to have DNA sequence datasets for analysis in the n-dimensional space in order to find the closet sequence (see abstract). The motivation is that the mathematically analysis and manipulation of sequence information (or dataset pattern such as DNA sequence) in a multidimensional space with a complex plane by using the fractal geometry in order to generate a new pattern that optimizes the information measure (Rothberg - col. 16, lines 4-14).

Claim 66 is essentially the same as claim 31 except that it is directed to a system rather than a method, and is rejected for the same reason as applied to the claim 31 hereinabove.

Claim 67 is essentially the same as claim 32 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 32 hereinabove.

Claims 68-69 are essentially the same as claims 33-34 except that they are directed to a system rather than a method, and are rejected for the same reason as applied to the claim 33-34 hereinabove.

Claims 70-73 are essentially the same as claims 35-38 except that they are directed to a system rather than a method, and are rejected for the same reason as applied to the claim 35-38 hereinabove.

Claims 74-83 are essentially the same as claims 39-48 except that they are directed to a system rather than a method, and are rejected for the same reason as applied to the claim 39-48 hereinabove.

Claim 84 is essentially the same as claim 49 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 49 hereinabove.

Claims 85-87 are essentially the same as claims 50-52 except that they are directed to a system rather than a method, and are rejected for the same reason as applied to the claim 50-52 hereinabove.

Claims 93-96 are essentially the same as claims 50-53, 55-61, and 63 except that they are directed to a system rather than a method, and are rejected for the same reason as applied to the claim 50-53, 55-61 and 63 hereinabove.

5. Claims 53-54 and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,416,848 issued to Young in view of US Patent No.6,141, 657 issued to Rothberg et al. (hereinafter Rothberg) and further in view of US Patent No. 6,389,428 issued to Rigault et al. (hereinafter Rigault).

With respect to claims 53-54, Young in view of Rothberg teaches as in claim 51.

Young in view of Rothberg does not teach wherein the step of examining a subregion comprises a reformatting process methodology based on methodologies such as Simulated Annealing, Hill Climbing Algorithms, Genetic Algorithms, or Evolutionary Programming Methods; and wherein the reformatting process is automated.

However, Rigault discloses algorithms (col. 1, lines 25-35 and lines 55-60); and reformatting process and automating (col. 4, lines 6-17, also see col. 1, lines 18-21 and col. 7, lines 60-67).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Young in view of Rothberg

with the teachings of Rigault so as to have algorithms and reformatting (col. 1, lines 25-35 and col. 4, lines 6-17). This combination would apply self-organizing algorithm to measure of similarity/dissimilarity relationships of sequence data (Agrafiotis – col. 3, lines 35-45) and to be for deriving proximity data and a display map for the object (col. 3, line 50-52 and col. 3, lines 65-67 and col. 4, lines 1-4) in the comparison of the dataset or sequence data of bio-informatics environment, provide the measurement of the points of image or fractal shape or points in plane map and ordered color set and data compression of colors (Young – col. 5, 55-67 and col. 6, lines 1-11) in the comparison of the dataset or sequence data of bio-informatics environment and the pattern of signals acting as points for comparing the target string with comparison string (col. 16, lines 52-67. col. 17, lines 1-36) and generating each set of signals in pattern by simulating the step of probing to each sequence in database sequence and choosing the target sequence in order to generate a new pattern that optimizes the information measure (col. 16, lines 4-14).

Claim 88 is essentially the same as claim 53 except that it is directed to a system rather than a method, and is rejected for the same reason as applied to the claim 53 hereinabove.

6. Claims 55-58 and 89-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,416,848 issued to Young in view of US Patent No.6,141,657 issued to Rothberg et al. (hereinafter Rothberg) and further in view of US Patent No. 6,453,246 issued to Agrafiotis et al. (hereafter Agrafiotis).

With respect to claims 55-58, Young in view of Rothberg teaches as discussed in claim 51.

Young in view of Rothberg does not teach wherein the step of examining a subregion further comprises analyzing and/or comparing points of interest by examining, either visually or mathematically, their relative locations and/or absolute locations within the region; wherein the step of examining a subregion further comprises analyzing and/or comparing points of interest by examining, either visually or mathematically, metrics other than location; wherein the metrics can be represented by graphic properties such as shading; and examining a subregion further comprises repeating the examining step for smaller subregions.

However, Agrafiotis discloses set of point (col. 11, lines 26-28) and computing the point/coordinating of an object (col. 10, lines 38-44); and points with color (col. 4, lines 11-21 and col. 9, lines 30-43); visualization display (col. 16, lines 31-46; also see col. 21, lines 15-29); and graphical property of the pixel (size, color gray scale: col. 4, lines 11-21); metrics (col. 12, lines 36-52 and col. 16, lines 31-36; also see col. 21, lines 15-29); shading area (col. 9, lines 30-35, also see fig. 5); and smaller region (col. 4, lines 11-21 and col. 9, lines 30-43).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Rothberg in view of Young with the teachings of Agrafiotis so as to have a shading, metric and small region (col. 16, lines 31-46, col. 9, lines 30-35). This combination would apply self-organizing algorithm to measure of similarity/dissimilarity relationships of sequence data (Agrafiotis – col. 3, lines 35-45) and to be for deriving proximity data and a visualization display map for the object (col. 3, line 50-52 and col. 3, lines 65-67 and col. 4, lines 1-4) in the comparison of the dataset or sequence data of bio-informatics environment, provide the measurement of the points of image or fractal shape or points in plane map and ordered color set and data compression of colors (Young – col. 5, 55-67 and col. 6, lines 1-11) in the comparison of the dataset or sequence data of bio-informatics environment and the pattern of signals acting as points for comparing the target string with comparison string (col. 16, lines 52-67. col. 17, lines 1-36) and generating each set of signals in pattern by simulating the step of probing to each sequence in database sequence and choosing the target sequence in order to generate a new pattern that optimizes the information measure (col. 16, lines 4-14).

Claims 89-92 are essentially the same as claims 55-58 except that they are directed to a system rather than a method, and are rejected for the same reason as applied to the claim 55-58 hereinabove.

Contact Information

7. Any inquiry concerning this communication should be directed to Anh Ly whose telephone number is (703) 306-4527 via E-Mail: **ANH.LY@USPTO.GOV**. The examiner can be reached on Monday - Friday from 8:00 AM to 4:00 PM.

If attempts to reach the examiner are unsuccessful, see the examiner's supervisor, John Breene, can be reached on (703) 305-9790.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: Central Office (703) 872-9306) (Central Official Fax Number

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Fourth Floor (receptionist).

Inquiries of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

JEAN M. CORRIELUS
PRIMARY EXAMINER

ANH LY
APR. 26th, 2004